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Impact of Self-Efficacy and Digital Pedagogy on Teaching Readiness of Digital Immigrant Childhood Teachers

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Abstrak
Telah banyak upaya untuk meningkatkan kesiapan mengajar pada guru PAUD. Namun hanya sedikit hasil penelitian yang menunjukkan upaya untuk meningkatkan kesiapan mengajar pada guru *digital immigrant* untuk anak usia dini dan hubungannya dengan efikasi diri pada guru. Oleh karena itu, penelitian ini bertujuan untuk 1) mengkaji kesiapan mengajar online pada guru *digital immigrant*, 2) menyelidiki peran efikasi diri dan penggunaan teknologi untuk memperdalam kajian ini. Penelitian ini mengadopsi pendekatan kuantitatif berdasarkan kuesioner yang diberikan kepada guru PAUD dengan karakteristik guru generasi *digital immigrant* dalam survei online. Dari perspektif metodologis, penelitian ini menggunakan teknik analisis SEM-PLS terhadap fenomena yang diteliti. Temuan ini menunjukkan bahwa efikasi diri pada guru PAUD *digital immigrant* dapat mempengaruhi kesiapan mengajar. Penelitian ini juga mencatat bahwa penggunaan teknologi pada guru *digital immigrant* berpengaruh positif dalam kesiapan mengajar. Penelitian ini memberikan penajaman terhadap penelitian-penelitian sebelumnya yang bertemakan kesiapan mengajar dalam menggunakan teknologi pada guru.
Kata Kunci: *Efikasi Diri; Pedagogi Digital; Kesiapan Mengajar; Guru Digital Immigrant*

Abstract
There have been many efforts to improve teaching readiness in PAUD teachers. However, only a few research results show efforts to improve teaching readiness in immigrant digital teachers for early childhood and technical with teacher self-efficacy. Therefore, this study aims to 1) examine the readiness to teach online in immigrant digital teachers, 2) investigate the role of self-efficacy and technology use to deepen this study. This study uses a quantitative approach based on a questionnaire given to PAUD teachers with the characteristics of immigrant digital generation teachers in an online survey. From a methodological perspective, this study uses the SEM-PLS analysis technique for the phenomenon under study. These findings indicate that self-efficacy in immigrant digital PAUD teachers can affect teaching readiness. This study also notes that the use of technology in immigrant digital teachers has a positive effect on teaching readiness. This study provides sharpening to previous studies on the theme of teaching readiness in using technology in teachers.
Keywords: *Self-Efficacy; Digital Pedagogy; Teaching Readiness; Digital Immigrant Teachers*

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Introduction

Digitalization has significantly impacted various sectors, including education. Learning, which was previously conducted in classrooms, has transformed into digital learning using technology and the internet (Chertoff et al., 2020). This shift presents a major challenge for early childhood education teachers in Indonesia, particularly for digital immigrant (DI) generation teachers. One factor driving this sudden change is the emergence of various complaints from parents and children regarding the difficulties they face in participating in digital learning. As of the end of April 2021, the Indonesian Child Protection Commission (KPAI) received at least 246 complaints, including issues such as heavy workloads, one-way learning, high education costs, and learning responsibilities shifting to families (KPAI, 2021). Consequently, teachers must adapt to these conditions to ensure that the material is effectively delivered to students.

The term "Digital Immigrant Teachers" refers to educators born before the digital era who have had to adapt to rapidly developing information and communication technology (ICT) (Hiremath et al., 2021). DI teachers face challenges in integrating technology into learning as they did not grow up in a highly technological environment. Although DI teachers were born in a pre-digital era, as the primary drivers of education, they must adapt to these advancements. Therefore, DI teachers must develop technology-based methods, media, or resources that cater to the needs and characteristics of digital-native children.

Teacher readiness is crucial for successfully implementing digital-based learning (Scherer et al., 2021). Readiness refers to a teacher's willingness and maturity in responding to and adapting to challenges, such as those posed by the pandemic (Hung, 2016), In Indonesia, digital learning is expected to continue even after the pandemic (Amalia & Sa'adah, 2020; Handarini & Wulandari, 2020; Sadikin & Hamidah, 2020).

Achieving success in digital learning requires DI teachers to possess several components, one of which is self-efficacy. Teacher self-efficacy refers to the belief in one's ability to influence the teaching and learning process (Bandura, 1997). It is a critical factor in addressing the challenges of teaching readiness in the current digital era (Michos et al., 2022). It is a critical factor in addressing the challenges of teaching readiness in the current digital era (von der Embse et al., 2016), It is a critical factor in addressing the challenges of teaching readiness in the current digital era (Gundel et al., 2019; Pressley & Ha, 2021) and enhance teacher professionalism in adapting to school challenges (Aloe et al., 2014). Research suggests that teachers with high self-efficacy can positively impact students' learning outcomes(Perera et al., 2019; Romel et al., 2021).

The relationship between teaching readiness and digital pedagogy is a new phenomenon. Improving the quality of learning in Indonesia requires school institutions to be ready to provide appropriate facilities and services for children (Trenggono Hidayatullah et al., 2023). However, there has been little research on the teaching readiness of DI teachers. Most studies focus on school institutions' responses to educational transformation (Athfal & Kalipucang Pangandaran, 2022; Kurniasih, 2019; Peng & Yu, 2022; Santi Indra Astuti & Juli R. Binu, 2022). Since teachers are the driving force behind successful learning, they must create engaging learning environments for digital-native students.

Technology integration in education involves using technology to deliver content, enhance learning experiences, and transform the teaching and learning process (Lai & Jin, 2021). Multimedia is essential for distance learning, and technology integration supports adaptive learning (Backfisch et al., 2021). Teachers must not only use technology but also critically reflect on its possible consequences and risks (Michos et al., 2022). Although the availability of technology is necessary for integration, more crucial factors include teacher knowledge, self-efficacy, and professionalism (Howard et al., 2021).

The success of technology use in education depends on factors such as usability, ease of use, attitudes towards technology, and system quality (Davis, 1985). These factors can influence the successful use of a technology (Arianto et al., 2020; Lah et al., 2020). The

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Technology Acceptance Model (TAM) is often used to understand the factors that predict technology acceptance and provides a foundation for examining variables that influence technology use (Ibieta et al., 2017; Walker et al., 2020; Xie et al., 2019).

Globally, the emphasis on technology integration in early childhood education has grown. Previous literature shows that teachers' abilities to integrate technology significantly impact their teaching readiness (Dong, 2018; Edwards, 2013; Farjon et al., 2019). Teachers must be competent in managing digital tools and applications to support online learning (Liu & Pange, 2015). Even as the pandemic subsides, digital learning will continue, particularly in the realm of digital pedagogy. For teachers, digital pedagogy is essential for teaching readiness (Barry et al., 2021; Landa et al., 2021; Sailer et al., 2021). The use of technology by teachers in the future can have an impact on digital learning performance (Bidarian et al., 2011; Copriady, 2014; Huang et al., 2021). The integration of technology in learning will not only persist but will also be key to developing children's 21st-century skills. However, DI teachers in Indonesia still face difficulties in using technology effectively, primarily because they did not grow up in a technological era.

Methodology

This research uses a quantitative approach, using a cross-sectional survey in the Central Java and Yogyakarta regions, Indonesia. To understand digital teaching readiness among PAUD teachers in Central Java and Yogyakarta, this research included several variables, namely self-efficacy and technology use which were measured using the technology acceptance model. The data in this survey was collected from an online questionnaire using the Google Form application which was distributed to respondents. Yogyakarta, in particular, is known as a student city and educational center with many renowned universities and higher education institutions. This makes Yogyakarta a center for intellectual studies and research, where access to data and research subjects is easier and more varied. Central Java also has many educational cities such as Surakarta (Solo) and Semarang, which provide access to a more educated and diverse population in terms of economy, social, and culture.

This research adopts a survey method to collect data and test hypotheses with a structured questionnaire. The questionnaire in this research was developed in accordance with a literature review and adapted from previous research. Therefore, to measure self-efficacy we included 10 questionnaires from (Clark & Newberry, 2019) and (van Rooij et al., 2019), use of technology using the framework of the technology acceptance model (Davis, 1985) by including 11 questionnaires, and the teaching readiness variable by teachers and institutions including 16 questionnaires (Howard et al., 2021). The instrument was translated from English to Indonesian and adapted to the context and research subjects in the Central Java and Yogyakarta regions, Indonesia. We included a five-point Likert scale of "strongly disagree" (1) to "strongly agree" (5).

This research uses a multivariate data analysis method to analyze the data. This study has two technical calculation steps, namely the outer model and inner model as requirements for structural model analysis. The outer model includes convergent validity, discriminant validity and reliability assessment of the composite to achieve SEM-PLS criteria. The construct is declared to have achieved convergent validity if the loading factor shows a number more than 0.7 and the Average Variance Extracted (AVE) shows a number more than 0.50 (Hair, 2014), and Cronbach's Alpha should be higher than 0.70. Apart from the outer model, this research followed the inner model technique which assesses the model structure for the path coefficient problem. Then, to find out the significance of the variable, the t-values must exceed 1.96 and the p values must be less than 0.05 (Sarstedt et al., 2021). To determine the significance of variables that act as mediation, use Confidence Intervals Bias by paying attention to the lower limit and upper limit numbers. If the range between the lower limit and the upper limit is more than 0 then the mediation variable is declared significant. (Dash & Paul, 2021). We

analyzed using the smartPLS application (version 3.0) to estimate the hypothesis with significance at the 5% level.
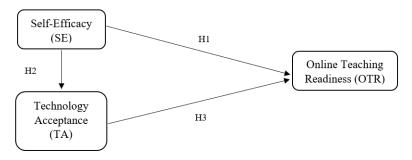
Figure 1. The Research Framework
Source: (Clark & Newberry, 2019; Davis, 1985; Howard et al., 2021)

Result and Discussion

Outer Model

Table 1 shows the characteristics of the respondents involved, in this study they are early childhood education teachers. The respondent table shows the characteristics of early childhood education teachers in Indonesia, which consists of several regions. Respondents are early childhood education teachers who already have teaching experience and are dominated by women. Table 2 informs the calculation of the outer model. The overall loading factor ranges between 0.727-0.815 (>0.70), this can indicate that this research meets the convergent validity milestones. Furthermore, to state discriminant validity when AVE is higher than 0.50 to be achieved. As seen in Table 2, it can be illustrated that the AVE score ranges between 0.570-0.616, implying that the discriminant validity criteria have been confirmed. Furthermore, Composite Reliability must be more than 0.70 (Hair, 2014). From this table, the Composite Reliability value ranges between 0.913-0.935, so it meets the composite reliability criteria.

Table 1. Respondent Characteristics
Respondent Characteristics

Characteristics	Frequency	Presentage
Region		
Yogyakarta	152	22.7%
Semarang	125	18.6%
Surakarta	82	12.2%
Sukoharjo	39	5.7%
Klaten	63	9.4%
Salatiga	54	8.0%
Magelang	41	6.0%
Boyolali	32	4.8%
Banyumas	30	4.5%
Sragen	26	3.9%
Wonogiri	21	3.1%
Kebumen	5	0.7%
Wonosobo	3	0.4%
Experience		
Permanent Teacher	373	55.7%
Teacher Shadow	296	44.3%
Long Time Teaching		
1-6 Months	94	14%
6-12 Months	147	22%
>12 Months	428	64%

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Inner Model

Previous calculations show that the model has met the validity and reliability tests. For further analysis, this research combines PLS estimation to build a structural model with inner model testing. This aims to test the relationship between constructs. All data was run using 500 bootstrap samples over 300 cases.

Table 2. Measurement Results

Construct	Item	Loading	Cronbach Alpha	CR	AV
Self-Efficacy	SE1	0.743	0.894	0,914	0,57
	SE10	0.770			
	SE2	0.763			
	SE4	0.727			
	SE6	0.746			
	SE7	0.784			
	SE8	0.764			
	SE9	0.740			
TAM	TA1	0.787	0.889	0,913	0,59
	TA10	0.773			
	TA2	0.798			
	TA3	0.801			
	TA4	0.736			
	TA5	0.754			
	TA9	0.768			
OTR	OT1	0.753	0.922	0,935	0,61
	OT10	0.748			
	OT11	0.732			
	OT12	0.790			
	OT2	0.762			
	OT3	0.845			
	OT4	0.806			
	OT5	0.815			
	OT6	0.805			

Table 3. Path coefficients and results of hypotheses testing

Hyphoteses	Relation	T-Statistics	P-Values	Decision
H1	SE ⟶ OT	2.024	0.044	Accepted
H2	SE ⟶ TA	47.909	0.000	Accepted
H3	TA ⟶ OT	9.096	0.000	Accepted

Furthermore, from the results of data processing it can be seen that the inner VIF range is between 1,000-2,354, which implies that there are no collinearity problems in the model. As shown in Table 3, all hypotheses were accepted because the range of p-values was within 0.000-0.044, less than 0.05.

Model Fit

R-square (R2) aims to predict the accuracy of the model, with categories: 0.75 (substantial), 0.50 (moderate), and 0.25 (weak) (Hair, 2014). According to data processing, it shows that R2 for OT is 0.387, implying that SE and TA can perform around 38% percent of OT variables in the weak category. Furthermore, R2 for TA is 0.575, implying that around 57.5

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percent of the OT variable explains SE, and TA to a moderate extent. In addition, this study includes F2 to estimate the size of the variable construct.

Discussion

The first hypothesis aims to test the relationship between teacher self-efficacy and teaching readiness in digital immigrant teachers. This study confirms previous findings by (Howard et al., 2021); (Scherer et al., 2021), which revealed that high teacher self-efficacy, especially teachers who know strategies and are able to adapt to changes in learning, can influence their readiness to teach online, teachers can communicate clearly regarding the learning they want to convey, teachers are also able to provide feedback to children to help students in learning. Apart from that, judging from school policies, some already have a clear vision for online learning, but because they are in the adaptation stage, ICT facilities and infrastructure in institutions still need to be developed. Several institutions support the professional development of teachers in online learning, this is proven by the existence of training and seminars for teachers in Indonesia carried out by the government to develop teachers' readiness to teach online in order to create a supportive environment.

These results are also relevant to previous literature by (Köklü Yaylacı & Olgan, 2021); (Chesnut & Burley, 2015) who wrote that self-efficacy influences enthusiasm for teaching and commitment to carrying out the profession. Of course (Hettinger et al., 2021) revealed that self-efficacy is a teacher's belief related to their ability to successfully carry out professional tasks, control distractions that occur during learning, enable students to follow class rules and provide time for learning. Self-efficacy is very important to apply to teacher personality, especially in online learning in Indonesia, where teaching challenges and learning changes are very visible.

In relation to the first question, self-efficacy can increase digital pedagogy. These findings support several previous studies by (Taimalu & Luik, 2019); (Michos et al., 2022) which states that self-efficacy influences the use of technology in learning, especially teachers who are able to use digital tools such as gadgets, tablets, notebooks as part of learning practices, teachers who have high self-efficacy can have an influence on increasing learning productivity. These results can be explained by the fact that teachers who have confidence in mastering the class are able to create a comfortable atmosphere while online learning is taking place. Some children are able to use gadgets to search for and absorb information according to teachers' directions, but online learning cannot be separated from collaboration between parents, so that children feel more secure and are able to explore deeper experiences and knowledge in online learning.

Apart from the first and second hypotheses, this research found that integrating digital tools in learning can influence online teaching readiness. This finding is relevant to previous research by (Backfisch et al., 2021; Lai & Jin, 2021) that integrating technology is the key to successful implementation of online learning. At the same time, the results of the study show that the ability to integrate high technology in teachers can help increase the effectiveness of learning in the classroom, so that teachers are professionally prepared to carry out learning and face future challenges that will be encountered, especially during online classes. These results agree with (Landa et al., 2021; Qazi et al., 2021; Tang et al., 2021) that integrating technology in learning can trigger teachers' readiness to teach online, this is because technology is a priority tool and source of communication and searching for information related to learning material.

Teachers with high self-efficacy are more confident in using technology and facing challenges that may arise during the digital learning process. They tend to feel capable of learning and mastering new digital tools needed to teach effectively in a technology-based environment, in addition, teachers with high self-efficacy are more flexible and able to adapt quickly to changes, such as the transition from face-to-face to digital teaching. This belief in their own abilities makes them less likely to feel stressed or overwhelmed when faced with

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new technology or digital-based learning methods. They tend to be more positive in dealing with educational technology, which in turn makes them more prepared to use the technology in learning.

High self-efficacy influences how teachers understand and use technology in the teaching process. Teachers who feel capable of using technology tend to experiment more with digital tools and online learning platforms, and are better prepared to prepare digital-based materials. In digital teaching, especially distance learning, challenges such as difficulty interacting with students or maintaining student engagement become more complex. Teachers with high self-efficacy are better prepared to face these challenges by designing interactive and engaging learning methods through technology, and are better able to maintain student engagement virtually.

Self-efficacy plays a role in developing digital learning strategies. Teachers who are confident in their abilities will be more creative in designing innovative teaching methods, such as the use of multimedia, learning videos, and interactive educational applications to enhance students' learning experiences. High teacher self-efficacy not only impacts teaching readiness, but also student learning outcomes. Teachers who are confident in teaching digitally will be better able to deliver material effectively, which ultimately improves student understanding and learning outcomes. Teachers who have high self-efficacy tend to provide a higher quality learning experience, because they feel capable of optimizing the use of technology and adapting teaching approaches to students' needs in the digital era.

Integrating technology for early childhood education teachers who are digital immigrants can be done effectively through a gradual approach, the use of simple tools, ongoing training and support, and active involvement from parents. The key to successful technology integration is ensuring that technology helps and complements the learning process without being a burden, and empowering teachers to develop their confidence and abilities in the digital world.

Based on the results of this study, it can be interpreted that the environmental conditions of digital immigrant teachers are in the form of a gradual training program for digital immigrant teachers need structured and gradual training to understand the technological tools that they can use in teaching. This training should start from the basics such as the use of devices (tablets, computers) to interactive learning applications that are child-friendly, and then technical assistance: after training, ongoing assistance is needed. This can be in the form of direct technical support in the field or through study groups that help teachers share best practices and overcome technological difficulties together.

Conclusion

The main objective of this study was to determine the factors that can influence the readiness to teach online in PAUD teachers of the digital immigrant generation. We propose several hypotheses, namely three hypotheses and all are accepted. This finding indicates that the use of technology in learning as measured by the technology acceptance model (TAM) can positively influence the readiness to teach online. Then, self-efficacy in teachers has a positive effect on the use of technology in learning. Finally, your findings confirm that self-efficacy in teachers can influence the readiness to teach online. This finding indicates that some institutions have readiness related to the vision for the future, but some teachers are hampered by the means and facilities used to teach online, this is because some schools are still in the process of adaptation. If this is not a shared concern, both from stakeholders and the government, then online learning will continue to be a burden, so that learning is not carried out successfully. This finding is an important point for stakeholders to pay more attention to teacher readiness in teaching online. The limitation of this study is that the respondents came from teachers. For further recommendations, it is necessary to include various levels of elementary, middle, high school and college so that the readiness to teach teachers online can be known in detail. Practical Training Focused on Real Experience is a solution to increase self-

efficacy in the context of using digital technology in the classroom. Examples of activities are Scenario-based exercises or simulations where teachers practice using technology in teaching contexts similar to their everyday classrooms will increase self-confidence. For example, using interactive devices such as smartboards, learning applications, or online learning platforms such as Google Classroom and Zoom.

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